PAPER – 5: STRATEGIC COST MANAGEMENT AND PERFORMANCE EVALUATION

××× CASE STUDY ×××

Gain Sharing Arrangements

1. The Board of Studies (BoS) at **Country Law Institute (CLI)** has recently revamp the one of its certification courses on 'law applicable to fin-tech transactions' into 'law applicable to transactions involving fin-tech especially the application of Blockchain'. CLI is expecting increase in enrollment. It expects around 1,000 candidates will enroll for course in each of upcoming batch, due to enhanced coverage of quality content which is more relevant in current scenario. CLI has printing division which operates the printing press for the printing of study material only. The estimate of cost of printing the study material for revised certification course is ₹1,750/- per set*, but ₹2,000/- is added to the course fee as fee for self-learning material. BoS always argue the cost of dispatching/ posting the study material to candidates' postal address is always more than Rs. 250/- in the majority of cases, hence ₹2,000/- is subsidies price and such difference is met with grants from government agencies. Since the study material is developed by external resources persons and industry experts, hence royalty will be paid by CLI to such authors.

*The break-up of cost and other relevant information are as follows:

- Direct Material Cost is ₹560/- (largely paper, supply of which is taxable at rate of 12%)
- Direct Labour Cost is ₹265/-
- Variable Overheads are ₹725/- (including royalties fee of 200/-)
- Total Fixed Overheads (absorbed based on ABC) attributable to printing of 1,000 set of study material of revised certification course is ₹2,00,000/-, out which 1,20,000 are committed in nature, hence can't be avoided.

Material costs are on CIF basis; since the books are exempt from GST hence credit is neither booked nor claimed by the printing division of CLI.

Considering the expected registrations, Director BoS signed the requirement to print 1,000 set and send the same for approval of Chairperson's office. In meantime government came-up with notification that grant and aids to CLI will be dispensed and CLI shall stand-out as autonomous and self-financing institute. Chairman is concerned with cost efficiency and consider printing is neither a value-generating nor strategic activity for CLI, hence it is beneficial to outsource printing of study material; if economically cheap. Hence on office order to advertise for e-tender signed by chairman, copy of which sent to governing body.

Mr. Gurumurthy, one of members of governing council oppose chairman stating what about the quality and confidentiality. Mr. Vyas, another member also argues that cost of in-house printing will also come down due to learning curve, but out-source supplier will keep on

charging same price. Chairperson mentioned that during recent days, while reading about pros and cons of outsourcing contracts; he read about Gain Sharing Arrangement (GSA). He further mentions a GSA clause shall be inserted in outsourcing contracts, but Mr. Vyas highlight the high failure rate of GSA; whereas some other members said they don't know GSA actually means.

Against the tender, an out-sourcing proposal from 'Janta Press' is also received in which they offer to print 1,000 set at a total cost of ₹14.50 lakhs. The cost includes insurance and freight till delivery at CLI stores. Royalties are still to be paid by CLI to authors but at time of sale of set. Janta Press is in same business for last 20 years and renowned for quality. Janta Press is also awarded by local government and other agencies for using 100% recycled paper.

Required

You are working in the finance department as a management accountant. Chairperson asks you to-

(i) EVALUATE the outsourcing proposal from 'Janta Press' and advise the governing body whether the same shall be accepted or not.

(ii) Considering the facts mentioned in the case study and argument raised by the members of governing body, identify to high-light and evaluate the non-monetary aspects of the outsourcing (the printing of 1,000 set of study material to 'Janta Press') to draft a case:

  (i) For, and

  (ii) Against

(iii) ADVISE governing body why do GSA fails and what CLI can do to make gain sharing clause work effectively.

×××QUESTIONS×××

Overall Equipment Effectiveness (OEE)

2. **Siara Bearing Balls Limited (SBBL)** is the famous name for bearing balls of different sizes. Mr. Syal recently joined as Manager Production and Operations at Unit 3 of Ludhiana (in Punjab) plant of the SBBL, wherein 10mm diameter steel ball bearings for bicycles are manufactured. The plant is largely automated and lashed with the latest technology machines.

From Mr. Singh, Plant Accountant Mr. Syal come to know that since machines are of the latest technology and workers are motivated due to the liberal workman policy of SBBL, hence productivity and quality is and was never an issue, but availability is. Over lunch,

when Mr. Syal greets Mr. Kumar, Plant Head, he also expresses his worry over excessive downtime and optimal use of limiting factors.

Mr. Syal, while navigating the ERP and reviewing the files & other documents handed over to him, which was prepared and maintained by his predecessor; come across the OEE rate of 93.555% measured during last week for machine '107-10M-Bearing' (which is limiting factor – caused bottleneck activity) during a normal shift. Since the said machine has a high-performance rate of 105%; hence Mr. Syal decided to dig deep into the composite OEE.

In the normal shift of 9 hours workers are allowed to take 2 short breaks of 15 minutes each and a lunch break of 30 minutes. During such a normal shift, out of the total manufactured 27,216 bearing balls by said machine, only 272 balls are found defective.

Required

(i) DETERMINE the unplanned downtime witnessed by machine 107-10M-Bearing and advise Mr. Syal, the best way-out to reduce the same (in brief).

(ii) MEASURE the Ideal Cycle Time to manufacture a single bearing ball.

(iii) APPLY, Goldratt's five steps that can be applied to remove the bottleneck at the Ludhiana plant of SBBL.

Environmental Management Accounting

3. **Siara Paper Mart (SPM)** is in process of getting ISO 14001:2004 Environmental Management Systems (revised ISO 14001:2015) certification. SPM is selling eco-friendly and wheat straw-based paper of different sizes (A3, A4, and A5) and GSM under the brand 'Prime'. Prime is a famous name among both commercial and household consumers.

For purpose of getting certified, a cross-functional team is constituted, which is responsible ***'to improve the environmental impact & image of SPM as eco-friendly enterprise and control environmental cost'***, which collects the following particulars relating to the H1 and H2 (first and second half of the relevant fiscal year respectively)

Disposing of the toxic material costs ₹1.2 crores to SPM in H2 which is 20% lesser than what was spent during H1. Committee responsible for formulating policy matters on environment-related aspects in SPM has departmental budget of ₹6 lakhs p.a., in H1 the utilisation rate was 80% and in H2 it was 110%.

Environmental audits earlier used to conduct on a half-yearly basis, but management decided to reduce the frequency to quarter each, in the mid of such year. Each such audit cost ₹8 lakhs to SPM. In the H2 SPM extends the production capacity and installed the new plant & machinery which has put to use cost of ₹77.25 crores, this is the premium version of the plant and machine due to its capability to reduce the generation of waste.

Erection and other installation costs including dry-run were ₹65 lakhs and the same for all versions. The standard version has on-board cost of ₹76.20 crores.

SPM is practicing the recycling policy, which was formulated around three years ago; for the scrap, it generates in its plant. The review of the recycling policy is pending for the last 12 months. The cost incurred during the fiscal year was ₹2.75 crores, spent in alignment to scrap generated during the year. The policy document also states– *'zero discharge of waste/scrap into the environment, in order to be true-sense eco-friendly enterprise'*.

In H2 contamination test was performed which cost ₹4 lakhs to SPM. The monitoring cost incurred during the year was ₹78 lakhs; in H2 this was double then H1.

Required

(i) PREPARE the environmental cost statement as per the classification suggested by 'Hanson and Mendoza'.

(ii) ANALYSE the elements of environmental cost at SPM.

(iii) EVALUATE whether the cross-functional team is successful in serving their 'terms of reference'.

Note- Clearly State the assumptions (if any).

Annexure

Scrap Generated (during the year)

Quarter	First	Second	Third	Fourth
Scrap generated and recycled	1,572 MT	1,428 MT	1,114 MT	886 MT

Performance Pyramid

4. **Roadrunner** is a trucking company that ships commercial goods for companies to various ports within the state of Gujarat. These ports facilitate further shipments of goods by sea to their final destinations. The company aims at maintaining good quality delivery standards to make its mark in the competitive environment it operates.

The entire shipment of the company is for deliveries from various destinations within the state to one of the ports. During the truck's return journey, the company tries to have a shipment from the port to one of the major destinations within Gujarat. In trucking jargon, a truck on the road without carrying any load is called "deadheading". A trucking company will try to minimize the kilometers covered in a deadhead because it is unproductive. Therefore, the company has agents on the ground, who can find appropriate shipments within few days' time. This way the utility of the truck and productivity of each shipment journey improves.

All shipments thus far have been "Full Truck Load" (FTL) shipments. This means, that the entire truck is booked for the shipment of goods of just one client. The goods collected

from the client are delivered directly to the destination port. Advantages of FTL shipments are→ minimum handling of goods, loading and unloading will be from that single vehicle and fast delivery of goods with minimum damage.

Due to low fuel prices, the company has been enjoying reasonable profits from this business. However, fuel prices have increased over the last few months. Due to economic slowdown, number of shipments have been stagnant for a while. There is a possibility of reduced size of shipments in the coming year. Therefore, the company plans to offer "Less than Truck Load" (LTL) shipments to many of its clients. Here, shipments by the clients will be larger than a parcel carrier can handle, but not enough to require an FTL shipment. Shipment loads from various clients will be collected at a common collection area. Shipments to common destination port will then be loaded onto a truck and delivered at that specific port. Typically a client is willing to wait for maximum 7 days from the time goods are handed over for delivery to the actual delivery at the port. The advantage of this type of shipment is that it facilitates smaller consignments to be shipped at economical cost to the company. This brings flexibility in operations to the business. At the same time due to smaller shipments, the clientele base has to increase so that when the truck leaves on a shipment journey its capacity is completely utilized.

This decision to introduce LTL shipments in addition to FTL shipments has been a strategic change for the business. At present, Roadrunner handles about 15% of the total consignments that are made from within Gujarat to the various ports. It wants to maintain and if possible grow its market share. However, competition is stiff in this sector. To get a larger clientele base, it has increased its advertisement spend to make its presence known in the market. Advertisement in specific trade publications, membership on trucking load boards that help to find clientele online, participating in trade association events etc. The company plans to target mid-sized companies as customers that can give shipment loads at regular intervals.

The senior management has targeted:

1) Cost-per-kilometer rate of ₹200.
2) Revenue per kilometer rate of ₹350.
3) Average Accounts Receivables collection period of 10 working days.
4) Average customer lifetime value: ₹ 20 lakhs and above. The target customer base would be mid-sized companies having shipments at regular intervals.

The senior management of the company has been focused only on the financials. However, they now acknowledge that other non-financial metrics also need to be tracked in order to sustain and improve the business. To assess the company's performance under the LTL system, below are some of the operational metrics that are proposed to be collated:

(a) Customer claims filed for damaged goods (absolute numbers and % of shipments made under the LTL system)

(b) Time taken to resolve the above claims (days from date of customer filing claim)

(c) Delays in delivery beyond the agreed delivery time (% of shipments made under the LTL system)

(d) Number of days truck was not on the road (due to maintenance or insufficient load)

(e) Average time taken to get full truck load under LTL (days)

(f) Deadheads (kilometers) : Kilometers during journeys when the truck had no load to carry

(g) Number of orders turned down due to non-availability of trucks

(h) Ability to deliver within 7 days from the date of receiving client's goods under the LTL system (% of shipments under the LTL system)

As a management consultant for the company, you plan to present the above information using the Performance Pyramid model suggested by Lynch and Cross.

Required

(i) IDENTIFY the Level 1 – Corporate Vision and Level 2 – Market and Financial measures that the company plans to follow to sustain business. Briefly EXPLAIN the rationale of the decisions taken at the Market and Financial business unit level.

(ii) CLASSIFY the operational level (measures a to f) into Quality, Delivery, Cycle Time and Waste metrics. Also link them to the Level 3 measures of Customer Satisfaction, Flexibility and Productivity.

(iii) Briefly ASSESS how measures (g) and (h) impact business.

Manufacturing Cycle Efficiency

5. **Glen Electronics** manufactures a wide range of electronic heaters and geysers. Glen was a popular name among retailers and customers, but it keeps on losing the market share; the major reason is emerging competitors are offering economical product customers with similar features and quality. The market where-in Glen operating is price sensitive, hence adding more features and establish itself as a premium brand is not the option. The only possible choice left with glen is to reduce prices for that it needs to reduce the cost to maintain the profit margin.

A cost management committee was constituted to study the scenario and recommend the solution to the board of directors. The committee based upon their study suggests a 3-phase solution, out of which phase one is 'stress on enhancing manufacturing cycle efficiency from its current level of 62.50%'. The committee collects the following data with help from the office of the Chief Management Accountant–

- Current batch wait time before the order getting process is 4 days.
- The time spent working on the products (batch processing time) is currently 20 days.

- Total time spent by the products waiting –to be processed, moved, inspected, and delivered (batch queue time) is currently 6 days.
- Currently, the time spent on making sure that the products are not defective (batch inspection time) is double that time spent in transferring products between workstations (batch move time).

The Board of directors based upon the committee's report decided to apply cellular manufacturing to reduce unnecessary move time. Based upon decision tasks are allocated to concerned functional managers.

Managers and workers showed their resistance by stating – "*we are not convinced that cellular manufacturing reduces motions on the production floor*". Some workers even mentioned they are not aware of what is current batch inspection time and batch move time.

Required

You are deputy to management accountant and was part of the committee, hence board approached you to convince the managers and workers as part for change management.

(i) CALCULATE current batch inspection time and batch move time.

(ii) CALCULATE manufacturing cycle time, and how much is non-value-added time? (in term of days)

(iii) CALCULATE revised manufacturing cycle efficiency if both batch inspection time and batch move time cut down to half of the current level and other elements remain constant.

(iv) What makes cellular manufacturing capable to reduce motions on the production floor and how benefit the workers? EXPLAIN.

Decision Making

6. Micro-Guard Industries Limited (MGIL) is a renowned company for a unique range of thoughtfully-engineered products, designed to provide simplified solutions and upscale your home interiors. MGIL engaged in the manufacturing of Power Systems, Batteries, Wires & Cables, Switch Gears & Modular Switches etc. But MGIL is largely famous for its wide range of Voltage Stabilizers. Each product is manufactured in a separate division.

While planning regarding voltage stabilizers division (VSD) for the first half of the fiscal year 20-21 amid the outbreak of COVID-19, the board get through a report from internal expert committee pertaining to crystal series of voltage stabilizers which says– *'due to restricted availability of the input factors (on account of lock-down by the government), only 40,000 crystal voltage stabilizers (CVS) is expected to manufactured and sold during the first half of fiscal, against the normal capacity of 75,000 per quarter; that too at ₹1,600/- per CVS'*. At normal capacity level it incurs the following cost to manufacture and sell single unit of CVS–

Particulars	Amount (₹)
Direct material	575
Direct labour	215
Variable overhead	310
Fixed overhead	300
Cost per unit	**1,400**

One of the directors suggested– '*since migrant workers moved to their home states and expected to come back in 3-5 months' time hence it is better to temporary discontinue (lock-out) the production for the first half of fiscal'*. Another director support him by stating– *'it will give the opportunity to our suppliers (or retailers) to clear the old stock available with them'*. On the reference by the board, you (chief management accountant at MGIL) provide an estimate to management that 1/3rd fixed overhead at a normal capacity level is unavoidable and additional cost due to discontinue (lock-out) of plant for 6 months and resumption thereafter is ₹ 35 lacs.

Required

You are required to ADVISE the management–

(i) Shall they continue the production of CVS or temporary discontinue (lock-out) for the first half of the fiscal year? (consider monetary aspects)

(ii) The qualitative factors which need to consider, while deciding either discontinue (lock-out) or continue.

(iii) What are the minimum number of CVS that VSD needs to manufacture and sell; in order to economically justify the continuation of the production?

Note*– In a legal sense, Lock-out means the temporary closing of a place of employment or the suspension of work, or the refusal by an employer to continue to employ any number of persons employed by him; which is way different from shut-down. But in management accounting lock-out and shutdown both carry the same meaning.*

Pricing Strategy

7. **Zutus Ltd.** is a leading Indian Pharmaceutical company which is a fully integrated, global healthcare provider. With in-depth domain expertise in the field of healthcare, it has strong capabilities across the spectrum of the pharmaceutical value chain. Zutus has earned reputation worldwide amongst pharmaceutical companies for providing comprehensive and complete healthcare solutions.

One of the drugs, Rifmn is an antibiotic used to treat contagious disease "Tbis". Rifmn is a patented medicine. The patent for which is now going to expire, and several other competitors are expected to enter in the market for selling the medicine using the same components of chemicals, under different other name. In order to reposition itself in the

market, the company is reviewing its pricing policy considering the market change and other threat.

The market research for Rifmn indicates that for every ₹4 decrease in price, demand would be expected to increase by 8,000 batches, with maximum demand for Rifmn being one million batches.

Each batch of Rifmn is currently made of using chemical salts:

Salt X: 367.50 gm at ₹0.08 per gm

Salt Y: 301.50 gm at ₹0.40 per gm

Each batch of Rifmn requires 30 minutes of machine time to make and the variable running costs for machine time are ₹40 per hour. The fixed production overhead cost is expected to be ₹35 per batch for the period, based on a budgeted production level of 3,00,000 batches.

The skilled workforce who has been working on Rifmn until now are being shifted onto the production of Zutus company's new antiviral drug (injection) for Viral Disease-19 which costs millions of ₹ to develop. Zutus has obtained patent for this revolutionary drug and it is expected to save millions of lives all across the world. The launch of this drug is excitedly anticipated all over the world, while its demand in unknown and no other similar specific drug exists. The average labor cost (outsourcing) of each batch of Rifmn is ₹38.60.

The management of Zutus considers that pricing decision of Rifmn should be based on each batch.

Required

(i) CALCULATE the optimum (profit-maximizing) selling price for Rifmn and the resulting annual profit which Zutus will make from charging this price.

(ii) RECOMMEND the pricing strategy for launching of new antiviral drug.

[Note– If P = a - bQ, then MR = a - 2bQ]

Just in Time

8. X sells 'mu-50' to its customers. It purchases mu-50 from Y @ ₹ 140 per unit. Y pays all freight to X. No incoming inspection is necessary because Y has a superb reputation for delivery of quality merchandise. Annual demand of X is 13,000 units. X requires 15% annual ROI. The purchase order lead time is 2 weeks. The purchase order is passed through EDI and it costs ₹ 2 per order. The relevant insurance, material handling etc. ₹ 3.10 per unit per year. X has to decide whether or not to shift to JIT purchasing. Y agrees to deliver 100 units of mu-50→ 130 times per year (5 times every two weeks) instead of existing delivery system of 1,000 units→ 13 times a year with additional amount of ₹ 0.02 per unit. X incurs no stock out under its current purchasing policy. It is estimated X incurs stock out cost on 50 units under a JIT purchasing policy. In the event of a stock out, X has to rush order which costs ₹ 4 per unit.

Required

Briefly COMMENT whether X should implement JIT purchasing system.

9. IPL is a leading manufacturing company. Under increasing pressure to reduce costs, to control inventory level and to improve services, IPL's Costing Department has recently undertaken a decision to implement a JIT System.

The management of IPL is convinced of the benefits of their changes. But Supplies Manager "W" fears with the Costing Department's decision. He said:

"We've been driven by suppliers for years ... they would insist that we could only purchase in thousands, that we would have to wait weeks, or that they would only deliver on Mondays!"

Required

COMMENT on Mr. W's viewpoint.

Budgetary Control

10. The following are 2 types of monthly control report of a CA firm showing gross collection (in ₹'000). The budgeted collection for the year ending on 31 March are ₹4,14,00,000 in total.

Type-X

'Gross Collection' Report for July

Activity	Budget	Most Recent Forecast for the year	Expected Variance
Accounting	16,560	17,250	690 (F)
Auditing	10,350	8,280	2,070 (A)
Taxation	14,490	13,386	1,104 (A)

Type-Y

'Gross Collection' Report for July

Activity	Monthly			Cumulative		
	Budget	Actual	Variance	Budget	Actual	Variance
Accounting	2,415	2,622	207 (F)	6,210	6,486	276 (F)
Auditing	1,380	966	414 (A)	3,450	2,691	759 (A)
Taxation	1,725	1,587	138 (A)	3,450	3,105	345 (A)

Required

IDENTIFY the type of *control system* for both types of report.

Customer Profitability Analysis

11. T is operating its entire business through its four customers T_1, T_2, T_3, and T_4. T_1 and T_2 are small pharmaceutical stores while T_3 and T_4 are large discount stores with attached pharmacies. T prices its products at 25% above variable cost, although all four customers demand and receive a sizable discount off the list price.

The Finance Officer Mr. K has been asked to undertake a customer profitability analysis that shows the profit from each customer and each customer channel, stand-alone pharmaceuticals, and large pharmaceuticals attached to discount stores.

Mr. K identifies ₹20,250 of general administration costs to small pharmaceuticals stores and ₹48,375 of general administration costs to the large discount stores.

You are required to assist Mr. K in preparing a customer profitability report as desired. Also COMMENT to improve T's profit.

Item	Small Pharmaceuticals		Large Pharmaceuticals		Activity Rate
	T_1	T_2	T_3	T_4	
Number of Orders	4	9	6	3	₹750
Order Size	₹40,000	₹20,000	₹4,25,000	₹4,00,000	n/a
Average Discount	5%	10%	18%	12%	n/a
Regular Deliveries	4	9	6	3	₹375
Expedited Deliveries	2	0	2	0	₹1,250

Balanced Scorecard

12. In the context of a balanced scorecard, IDENTIFY the perspectives of the following independent situations:

Sl. No.	Organisation	Target Parameter	Perspective
(i)	Courier Company	100% on-time delivery of priority dispatches.	---
(ii)	Tuition Centre	Set up class-on-internet facility for better reach of more number of students and absentees.	---
(iii)	Computer Manufacturing Company	Set up service centres is all major cities for after sales support.	---
(iv)	Government Taxation Department	Ensure Computer training to all officers above a certain rank to improve their capabilities.	---

Application of Learning Curve

13. The research and development wing of **Electronics Ltd.** has developed a new kind of energy efficient inverter motor with 5-star rating from Bureau of Standards of Energy for use in industrial generator. The initial trials noted that it would take 10 hours for the first motor, which is subject to learning curve of 80%. The cost of material per motor would be ₹2,500, labour charges ₹175 per hour and overheads amount to 125% of labour cost.

The first order received is for delivery of eight motors.

Required

CALCULATE price the company should quote to have a profit margin of 20% on sales.

SUGGESTED ANSWERS/HINTS

1. (i) The **CLI shall not accept the outsourcing proposal** from 'Janta Press' to print 1,000 sets of study material of the revised certification course.

The costs relevant to outsourcing decision shall only be that cost which can be avoided by accepting out-sourcing proposal. These costs have cost on account of direct material, direct labour, variable overheads excluding the royalty because same is still need to be paid by CLI, and avoidable portion of fixed overheads (absorbed on printing of such 1,000 sets).

Statement of costs which can be avoided (relevant cost)

Cost Head	Per-unit cost (In ₹)	Total Cost (In ₹)
Direct material	560	5,60,000
Direct labour	265	2,65,000
Variable overheads	525 (725-200)	5,25,000
Avoidable fixed overheads	-	80,000
Total costs which can be avoided		14,30,000

Since the maximum amount of costs which can be saved on account of outsourcing of the printing of 1,000 sets of study material is ₹ .14.30 lakhs, which is less than the price (Rs.14.50 lakhs) offered by 'Janta Press'; Hence CLI should not accept the outsourcing proposal.

(ii) **Non-monetary aspects which are in favour of the outsourcing (to Janta Press)**

CLI can focus on value-generating activities– The value chain of any organisation built from activates which converts the input into the final product for which customer is ready to pay. How much he is ready to pay, depends upon the value perceived by

him. Hence value-generating activities are of utmost importance and capable to generate competitive advantage. In case of CLI the candidates are customer who are ready to enroll in the revised certification course because now the course has enhance coverage with quality content which is more relevant to current scenario. Hence activities which capable to generate value for customer are coverage of course, the quality of content, and relevance. By outsourcing of printing job CLI can enhance the focus on such value-generating activities.

Note- Quality of content and quality of books (and it material) are purely different. Prior is of intellectual importance and later is only fact of material and appearance (no doubt may ease reading experience of candidate).

TBL effect– TBL stands for triple bottom line. TBL was suggested by Elkington in 1999, which focused on considering People and Planet apart from Profit. Since the outsource contractor Janta Press is awarded by local government and other agencies for using 100% recycled paper hence outsourcing to Janta Press **will improve the environment footprint of CLI**.

Experience of Janta Press and reputation– Since Janta Press is in the business of printing for the last 20 years and renowned for quality. Hence CLI may relax in reference to quality, moreover experience in the printing of 20 years; itself an assurance factor that the learning curve at Janta Press is quite mature, which convert processes into SOPs (Standard Operating Procedures).

Note- Printing is a core competency of Janta Press, while not in the case of CLI

Confidentiality is not an issue– Since is of printing of Study material, which is the intellectual property of authors for which they are honored with royalties; hence the copyrights of content is reserved with authors. So a breach of confidentiality of content will cause civil as well as a criminal liability on part of Janta Press.

Note- The number of copies printed is not confidential information.

Gain Share Arrangement clause can be inserted in outsource contract - Typically gain sharing clause requires the outsource contractor to present technology improvement or cost-saving ideas to the client (throughout the life of the outsource contract). Because some of these ideas may reduce the outsource price, as per clause a portion of the financial benefit will be shared with client. Hence in this case CLI can ask for insertion of GSA clause in the master services agreement.

Non-monetary aspects which are against the outsourcing (to Janta Press)

Reliability of outsourcing contractor to meet timelines (timely delivery) and continuity– Continues and timely availability of supplies is important in every business, CLI is not an exception to this; hence the reliability of outsource contractor **to meet timelines (timely delivery) and continuity** critical factors. Obviously in-house operation has more **reliability apart from flexibility** too. Even if CLI insert

'Make the loss good, if on account of delayed supply or no supply', the loss of contribution is easy to calculate and recover; but it is complex to compute loss of reputation and brand equity in money terms.

What to do with staff and spare capacity– Out sourcing will obviously result in spare capacity at printing division and also result in employees/workers who are not engaged now (if they are regular employee/worker). The following are two critical decisions which are resultant out of outsourcing and may cause a great un-rest;

Whether those staff will be engaged somewhere else or retrenched?

Will it impact the motivation of other employees?

Note- The casual worker can be hired and fire easily and at lesser cost rather regular workers due to provisions of labour laws and trade parlance.

Establishing co-ordination with outsource contractor– CLI need to establish coordination with Janta Press for drafting and signing agreement then execution of same (in term of placing order, printing as per instruction, conducting inspection of inward supplies, processing invoices and making payments, etc.), which may cause a bit extra effort and resource. As SPOC (single point of contact) is also need to designate at CLI to co-ordinate will Janta Press.

(iii) Gain-sharing Arrangement – Failure and Check-points

Gain-sharing arrangement leads to win-win situation hence becoming increasingly popular. In the outsourcing contracts the client is willing to insert continuous improvement clauses to capitalise on learning curve and process improvement through technology up-gradation etc. and outsource contractor (service providers) also find the same as great selling point.

So, gain sharing arrangement is a contractual understanding where the client (CLI) and outsource contractor (Janta Press) agree to share gains (measurable financial gains) as a result of continuous improvement or innovation.

Reasons - why gain sharing arrangement fails

Poorly drafting and structuring of clause/contracts– What matters the most in any contract, the risk and reward must be **clearly articulated and expressly mentioned**. Gain sharing is also about maintaining a **balance between risks and rewards** which the contractor and client are sharing. Hence a poorly drafted gain share arrangement clause in any contract is bound to fail.

Clue-less, careless and bungled implementation– A clueless implementation just to execute the innovation may lead to severe consequences apart from eliminating the possibility of gain.

Lack of confidence– The success of gain sharing arrangement largely rest on the level of trust between outsource contractors and clients. The confidence in each other,

create a ground which build-up the requisite appetite to accept the probable risk in attempting innovation and improvement.

Check-points and measures

CLI can overcome these obstacles by adopting the following standardized practices-

Excellence at end of outsource contractor is prerequisite– Innovations fosters only in an accommodating environment. CLI must assess the SOPs in application and Business environment at Janta Press to evaluate the efficiency and effectiveness as measures of excellence to cultivate and nurture the ideas.

Innovation is shared responsibility– Changes don't happen automatically, these need to make happen and innovation is not the sole responsibility of outsourcing contractor; hence mere inserting a clause and then sit back will not yield any result for CLI. CLI and Janta Press both need to push themselves in order to conceive an idea, concrete the thought, evaluate the viability and execute the same.

Be specific– CLI and Janta Press must express clearly, what will be constituted as gain sharing idea. A tentative schedule of possible innovations/ideas may also be mentioned in the contract for greater clarity.

Note- Mind it, minor improvements and marginal tweaks is not constituted as gain sharing idea.

Draft it in win-win structure– Gain-sharing is about maintaining a balance between risks and rewards which contractor and client is sharing, hence in order to keep both parties motivated GSA clause must create a win-win situation. Key factors are; how benefits will be shared, and equitable risk ownership.

Don't shy to negotiate– Larger details leads to lessen ambiguity and a high probability of yielding success. Hence both CLI and Janta Press need not be shy in order to resolve the concerns and bring clarity to contract.

Define the length and mode of reimbursement– In the case of recurring benefits, a cut-off date need to identify by mutual understanding between CLI and Janta Press to quantify how long the benefits can be shared. The mode of reimbursement shall also need to be documented.

Constitute an innovation taskforce– Execution is key to unlock the value of an idea, hence CLI and Janta Press can have their respective and common innovation taskforce who undertake the responsibility of implementation of innovation/idea. Developing business case after conducting a feasibility study shall be the responsibility of these task-forces.

2. (i) Unplanned downtime of machine 107-10M-Bearing

Overall equipment effectiveness (OEE) is a quantitative metric for measuring the productivity of individual equipment in a manufacturing plant. According to Seiichi

Nakajima who introduced OEE, it is capable to identify and measure the losses in a manufacturing process through availability rate, performance rate, and quality rate.

OEE = Availability Rate × Performance Rate × Quality Rate

Quality Rate

Particulars	Units
Output units – total count	27,216
Rejected units out of the above	272
Good units – good count (which met the quality criteria) (27,216 - 272)	26,944
Quality Rate (Good Counts / Total Counts) (26,944 units / 27,216 units) → 99.00%	

Since the quality rate is 99.00% and performance rate (105%), as well as overall equipment effectiveness (93.555%), is also given in the case; hence availability rate can be measure–

Availability Rate × 105.00% × 99.00% = **93.555%**

The **Availability rate is 90%** i.e., run time [*or* net operating time (NOT)] / planned production time [*or* net available time (NAT)]

Planned Production Time

Particulars	Time in minutes
Total possible time (9 hours × 60 minutes) [scheduled time]	540
Less: Planned down time [scheduled loss]	
Short breaks (2 breaks × 15 minutes)	30
Meal break (30 minutes)	30
Planned production time	**480**

Since the Availability rate is 90% and planned production time is 480 minutes, hence **run time shall be 432 minutes** (run time / 480 minutes = 90.00%).

Since unplanned downtime is the difference between run time and planned production time, hence **unplanned downtime of machine 107-10M-Bearing is 48 minutes.**

Particulars	Time in minutes
Planned production time	480
Less: Run time (actual time taken)	432
Unplanned Downtime	**48**

Note

Alternate Working Unplanned downtime = Planned production time (1 – availability rate) 480 minutes (1 - 90%) = 48 minutes

Advise–

In order to reduce the unplanned downtime, preventive maintenance shall be practiced either before or after each shift; and the **shine (out of 5S)** principle shall be adopted by the workman as part of the TPM initiative. It is expected that the time spends on preventive maintenance will be less than the current unplanned downtime of 48 minutes.

Alternate advice is also possible, provided shall be valid and reasonably relevant.

(ii) Ideal Cycle Time to manufacture a single bearing ball

Performance rate can be computed by dividing standard time required [*or* ideal operating time] with run time. Since performance rate (105%) is given in the case and run time (432 minutes) computed above; hence the standard time required to manufacture 27,216 bearing balls is 453.6 minutes (standard time required / 432 minutes = 105.00%)

So, standard time required to manufacture a single bearing ball (i.e., ideal cycle time) is **1 (one) second** (453.6 minutes × 60 / 27,216 balls) i.e., 60 bearing balls per minute.

Note

Alternate Working OEE = (Good count × Ideal cycle time) / Planned production time 93.555% = (26,944 × Ideal cycle time) / 480 minutes Ideal cycle time = 1 second per bearing ball

(iii) Goldratt's five steps to remove the bottleneck at Ludhiana plant of SBBL

Goldratt's theory of constraints describes the following mentioned five steps process of identifying and taking steps to remove the bottlenecks that restrict output.

1. **Identifying the System Bottlenecks,** likewise, at unit 3 of Ludhiana plant of SBBL, 107-10M-Bearing is limiting factor hence activity performed through/using this equipment is bottleneck activity.

2. **Exploit the Bottlenecks –** Limiting factor **(**Bottleneck's activity capacity) must be fully utilised and that too optimally. Currently the overall equipment effectiveness is already 93.555%, attention on the possibility to enhance the same is needful. (Like preventive maintenance shall be practiced to avoid unplanned downtime. Similarly for each production units, way-out depends upon the limiting factor of that unit.)

3. **Non-bottleneck activities are subordinate –** Bottleneck activity should set up the pace for non-bottleneck activities. Production units shall plan their production keeping respective limiting factors at the centre point, because even if the efficiency of non-bottleneck enhanced; same may be worthless due to scarcity of limiting factor (bottleneck activity).

4. **Elevate the bottleneck –** Eliminate the bottleneck by enhancing the capacity and efficiency. Major change (business reengineering) or continuous minor change (kaizen) may do.

   Note – There will always be one bottleneck in the system, if such bottleneck is eliminated then a new constraint emerges as a bottleneck. Hence this process continuous. Ultimately improvement is a never-ending continues process.

5. **Repeat the process –** Apply step 1 to new bottleneck activity which emerges at different production units of Ludhiana plant of SBBL and repeat the process.

For Your Understanding

Seiichi Nakajima led the introduction of TPM, OEE and the Six Big Losses in the early 1970s while at the Japanese Institute of Plant Maintenance. OEE is a quantitative metric for measuring productivity of individual equipment in a manufacturing plant. OEE identifies and measures losses of crucial parts in a manufacturing process namely availability rate, performance rate and quality rate.

OEE = Availability × Performance × Quality

OEE Factors are calculated as follows–

1. Availability: NOT / NAT = (432 / 480) × 100 = 90.00%
2. Performance: IOT / NOT = (453.60 / 432) × 100 = 105.00%
3. Quality: (IOT – LOT) / IOT = (453.60 – 4.533….) / 453.60 × 100 = 99.00…%

Or

$$\left\{\frac{\text{27,216 units - 272 units}}{\text{27,216 units}}\right\}\times 100$$

OEE = A × P × Q = 90.00% × 105.00% × 99.00…% = **93.555…%**

Alternative Presentation-I

Good Counts = 27,216-272 = 26,944 units

Planned Production Time= 540 mins. – 60 mins. = 480 mins. (or NAT)

OEE = (Good Counts × Ideal Cycle Time)/ Planned Production Time

{(26,944 / 60 units (per min.)} / 480) x 100 = **93.555…%**

Alternative Presentation-II

OEE = (Ideal operating time –loss operating time)/ Net Available Time

{(453.60 – 4.533….)/ 480} × 100 = **93.555…%**

Workings

1. Scheduled Time (total time) = 540 Minutes (9hrs. × 60 mins.)
2. Planned Down Time = 2 short breaks × 15 minutes +meal break 30 minutes = 60 minutes
3. Net Available Time (NAT) = 540 – 60 = 480 minutes
4. Unplanned Downtime = 48 minutes
5. Net Operating Time (NOT) = Net Available Time – Unplanned Downtime
   NOT = 480 – 48 = 432 minutes
6. Ideal Operating Time (IOT): 27,216 total units / 60 (units per min.) = 27,216 / 60 = 453.60 minutes
7. Lost Operating Time (LOT): 272 units / 60 (units per min.) = 272 / 60 = 4.533… minutes

3. (i) Siara Paper Mart

Environmental Cost Statement

Particulars	H1		H2	
	Amount (in lakhs)	% to total	Amount (in lakhs)	% to total
Environmental Prevention Costs				
Creating Environment policies [(6/2) × 0.8] [(6/2) × 1.1]	2.4	0.68	3.3	0.96
Investment in protective equipment [(7,725 – 65) – 7,620]	-	-	40#	11.58
Sub-Total (a)	**2.4**	**0.68**	**43.3**	**12.54**
Environmental Detection Costs				
Monitoring (78 in the ratio of 1:2)	26	7.40	52	15.06
Performing Contamination test	-	-	4	1.16
Environmental Audit [1 × 8] [2 × 8]	8	2.28	16	4.63
Sub-Total (b)	**34**	**9.68**	**72**	**20.85**
Environmental Internal Failure Costs				
Recycling Scrap (275 in the ratio of 3:2)	165	46.95	110	31.86
Disposing of Toxic Material	150	42.69	120	34.75

Sub-Total (c)	**315**	**89.64**	**230**	**66.61**
Grand Total (a + b + c)	**351.4**	**100**	**345.3**	**100**

 # Since the details regarding useful economic life of the newly erected plant and the machine is not given, hence the entire incremental cost recognised in H2 only (when put to use); despite the benefit will arise over the useful economic life in form of a reduction in generation of waste.

Concept Insight

Hansen and Mendoza in the year 1999 point out that environmental costs are incurred because of poor quality controls. They classify the environmental cost into the following four categories–

- **Environmental Prevention Costs–** Those costs associated with *preventing* adverse environmental impacts.
- **Environmental Appraisal Costs–** The cost of activities executed to determine whether products, process and activities are in *compliance* with environmental standards, policies and laws.
- **Environmental Internal Failure Costs–** Costs incurred from activities that have been produced but *not discharged* into the environment.
- **Environmental External Failure Costs–** Costs incurred on activities performed *after discharging* waste into the environment.

(ii) Analysis

The environmental cost incurred in H2 (₹345.3 lakhs) is comparatively less than what was incurred in H1 (₹351.4 lakhs). Environmental internal failure costs reduced in H2 (₹230 lakhs) in comparison to H1 (₹315 lakhs), but still a substantial component of total environmental costs (66.61% in H2 against 89.64% in H1). The reduction of environmental internal failure costs is the outcome of increased environmental prevention costs (12.54% in H2 against 0.68% in H1) and environmental detection costs (20.85% in H2 against 9.68% in H1).

Note – Since the policy document also states 'zero discharge of waste/scrap into the environment, in order to be true-sense eco-friendly enterprise' hence there are no environmental external failure costs.

(iii) Evaluation

Apart from getting the certificate, the cross-functional team has terms of reference *'**to improve the environmental impact** & **image of SPM as eco-friendly enterprise** and **control environmental cost'***

In the context of **controlling environmental cost**, the team attained a reasonable reduction in total environmental cost, impact in this environmental cost statement

(over H1 and H2) seem low because the incremental cost due to purchase of premium version of plant and machine is charged in H2, which will benefit in form reduced waste over the useful economic life.

In the context of **improving the image of SPM as an eco-friendly enterprise**, the policy document which in practice also states– *'zero discharge of waste/scrap into the environment, in order to be true-sense eco-friendly enterprise'* and same is also visible through environmental cost statement as there are no environmental external failure costs.

In the context of **improving the environmental impact**, SPM able to generate low waste in H2 (2,000 MT) in comparison of H1 (3,000 MT) just by installing new plant and machine which produce less waste, increased monitoring, and audits.

Hence it can be concluded that the team is successfully serving the terms of reference.

4. (i) Identification of Corporation Vision and Market and Financial measures for company's success.

Corporation Vision (Level 1) of Road runner is that "The company aims at maintaining good quality delivery standards to make its mark in the competitive environment it operates."

To increase its market growth and enlarge its clientele base, the company plans to increase it advertisement spend to make its presence known in the market. It is resorting to off-line print media, online media as well as by participating in relevant trade association events. It has a target clientele of mid-sized companies that have shipments to make at regular intervals. As explained above, it has to track customer satisfaction of its service with relation to the quality and delivery of its service.

To maintain financial sustenance, the senior management has put in place metrics that will track if the LTL venture is profitable. Difference between the revenue per kilometer and cost per kilometer would be the profit earned per kilometer. **The target profit per kilometer = ₹350 - ₹200 = ₹150 per kilometer**.

Also, the company is clear that it wants quick turnover of its accounts receivable. For getting credit worthy customers, it has targeted clientele whose customer lifetime value is at least ₹20 lakh or more. The presumption made is that these mid-sized companies are less likely to default on their bills. For quick turnover of its accounts receivable, it proposes to give a 10 day credit period to its client to settle the bill. Quick conversion of accounts receivable into cash helps maintain liquidity. This is specially important for Roadrunner to maintain since its costs of operations, especially fuel costs are going up. Also, during slowdown in the economy, the risk of default is higher. Therefore, quicker conversion of Accounts Receivable to cash is preferable for financial stability of the company.

(ii) Operational level measures and their link to customer satisfaction, flexibility and productivity.

The operations level measures can be classified as follows:

(a) ***Customer claims filed for damaged goods (absolute numbers and % of shipments made under the LTL system)*** **–** Quality of service. Incidents of such claims should be maintained at the very minimum to have good customer satisfaction.

(b) ***Time taken to resolve the above claims (days from date of customer filing claim)*** **–** Quality of service. Quick resolution of claims leads to better customer satisfaction.

(c) ***Delays in delivery beyond the agreed delivery time (% of shipments made under the LTL system)*** **–** Delivery of service. Incidents of such delays in delivery should be maintained at the very minimum to have good customer satisfaction.

(d) ***Number of days truck was not on the road (due to maintenance or insufficient load)*** **–** Waste of resource. Utilization of resources impacts productivity. Trucks have to be used efficiently in order to improve productivity.

(e) ***Average time taken to get full truck load under LTL (days)*** **–** Cycle time, time taken to complete the task. This should be kept at a minimum level to improve productivity. Faster the ability to fill up the truck, improves the utilization of resource and enhances productivity.

(f) ***Deadheads (kilometers)*** **–** Kilometers the truck is on the road with no load to carry– Waste of resource. When a truck runs on the road without any load, it incurs a cost but earns no revenue to recoup it. Therefore, the number of kilometer deadheads is a waste and should be kept at minimum.

(iii) Impact of measures (g) and (h) on business.

(g) ***Number of orders turned down due to non-availability of trucks*** **–** Flexibility of service. This metric has to be maintained at the very minimum. The business must be able to cater to as many orders as possible. Tracking this metric can indicate if the current capacity of trucks is sufficient to cater to the demand from customers.

(h) ***Ability to deliver within 7 days from the date of receiving client's goods under the LTL system (% of shipments under the LTL system)*** **–** Flexibility of service. It is given that under the LTL system on an average the client is willing to wait for maximum 7 days from the date of handing over goods until delivery. The ability to meet this expectation of the customer is very important to maintain and sustain business. Therefore, the company has to have sufficient capacity to cater to customers' expectation. It must have enough flexibility

(capacity) in its operations to accommodate any exigencies to ensure that this expectation is met.

Concept of Performance Pyramid

The performance pyramid links business strategy to the day-to-day operations of a business. It gives a "top-to-bottom" overview of an organization. The top level is the *strategic level*, next comes the *tactical level* relating to business units and operating systems. The lower base level are the *operational levels*.

Vision Statement (Level 1) defines the business strategy that the company wishes to have to achieve success and competitive advantage. The pyramid cascades the vision statement through strategies related to market growth and financial sustenance (Level 2). Market growth and financial sustenance are dependent on customer satisfaction, flexibility and productivity (Level 3). Level 3 measures are again dependent on operational factors such as quality, delivery, cycle time and waste.

Quality and Delivery linked to Customer satisfaction and further to market growth has external focus. These are non-financial in nature. Cycle time and waste, linked to productivity linked further to financial sustenance has internal focus. These internal efficiency metrics are viewed for their financial impact on business. Flexibility serves as an enabler that can provide customer satisfaction. It can also be linked to productivity of operations. It is a factor that shows how agile a company with respective to changes in business environment and competition.

Performance Pyramid is thus a pictorial representation in the shape of a pyramid representing the hierarchy of strategic, tactical and operational measures of the organization.

5. (i) Batch Inspection Time and Batch Move Time

It is given in the question that currently–

MCE is 62.50%,

Batch process time is 20 days, and

Batch queue time is 6 days.

Let presume batch move time 'x' then batch inspection time will be '2x' because currently double then batch move time.

Hence,

$$62.50\% \text{ or } 0.6250 = \frac{20 \text{ days}}{20 \text{ days} + x + 2x + 6 \text{ days}}$$

Solving linear equation

$$\Rightarrow 20 \text{ days} + x + 2x + 6 \text{ days} = \frac{20 \text{ days}}{.6250}$$

$$\Rightarrow 20 \text{ days} + x + 2x + 6 \text{ days} = 32 \text{ days}$$

$$\Rightarrow 3x + 26 \text{ days} = 32 \text{ days}$$

⇒3x = 32 days- 26 days

⇒3x = 6 days

⇒x = 2 days

So, **Batch move time** (x) is 2 days and **Batch inspection time** (2x) is 4 days

(ii) Manufacturing Cycle Time and Non-Value-Added Time (in days)

$$62.50\% \text{ or } .6250 = \frac{20 \text{ days}}{\text{Manufacturing cycle time}}$$

$$\Rightarrow \text{Manufacturing cycle time} = \frac{20 \text{ days}}{.6250}$$

⇒Manufacturing cycle time= 32 days

Or

Manufacturing cycle time includes all form of time a product spends (in manufacturing department).

Hence, Manufacturing cycle time = 20 days + 2 days + 4 days + 6 days = 32 days

Non-Value Added Time is that component of manufacturing cycle time which does not lead to any value creation directly.

Hence, Non-value added time = 32 days – 20 days i.e., 12 days

Or

2 days + 4 days + 6 days = 12 days

Note – if the discussion is regarding **customer response time** then non-value added time also includes wait time before the order getting processed.

(iii) Revised Manufacturing Cycle Efficiency if both batch inspection time and batch move time cut down to half of the current level and other elements remains constant.

Hence,

Batch process time is 20 days,

Batch queue time is 6 days,

Revised batch move time is **1 day** (half of 2) and

Revised batch inspection time is **2 days** (half of 4).

$$MCE_{Revised} = \frac{20 \text{ days}}{20 \text{ days} + 1 \text{ day} + 2 \text{ days} + 6 \text{ days}}$$

$$\Rightarrow MCE_{Revised} = \frac{20 \text{ days}}{29 \text{ days}}$$

$$\Rightarrow MCE_{Revised} = .6897 \text{ or } 68.97\%$$

Improvement is recorded from 62.50% to 68.97%, on account of cut down of batch inspection time and batch move time to half of current level.

(iv) **Cellular manufacturing** capable to reduce motions on the production floor. Cellular manufacturing is a **lean way** to enhance productivity by improving the performance in the context of time and motion involved in the production.

Cellular manufacturing is an application of **group technology** in manufacturing in which all or a portion of a firm's manufacturing system has been converted into **manufacturing cells** (a cluster of machines or processes located in close proximity and dedicated to the manufacturing of a family of parts). In this manner cellular manufacturing results in the reduction of move time by reducing material handling (through integrated cell) and transit time and using smaller batch sizes (even single unit).

Hence motion (movement) of material (& product) and worker on production is reduced on the production floor. This may also result in reduced queue time because batch size is small even single piece flow in some cases. This is beneficial to the worker as well in two ways, apart from enhancing the productivity for organisation; first, due to **less motion, fatigue will also be less** to the worker after working in a shift of the same tenure (if he is a piece-rate worker get more wages) and second since he is working on more than one machine and part hence may feel **more empowered**. So cellular manufacturing leads to win-win situation wherein organisation benefits reduced direct labour cost and the worker has heightened sense of participation.

6. (i) Demand function

b = change in price/change in quantity b = ₹4/8,000 units = 0.0005

The maximum demand for Rifmn is 10,00,000 units, so where P = 0, Q = 10,00,000, so 'a' is established by substituting these values for P and Q into the demand function:

0 = a – (0.0005 × 10,00,000)

0 = a – 500

Therefore,

a = 500

Demand function is therefore: P = 500 – 0.0005Q

Marginal cost

		Total ₹
Salt X	367.50g × ₹0.08	29.40

Salt Y	301.50g × ₹0.40	120.60
Labour	Given in ques	38.60
Machine running cost	(30/60 × ₹40.00)	20
Total marginal cost per batch		208.60

Marginal revenue function: MR = a – 2bQ

Equate MC and MR and insert the values for 'a' and 'b' from the demand function in step 1

⇒ 208.60 = 500 – (2 × 0.0005 × Q)

Solve the MR function (to determine optimum quantity, Q)

⇒ 208.60 = 500 – 0.001Q

⇒ 0.001Q = 291.4

⇒ Q = 291,400 batches

Calculate the optimum price

⇒ P = 500 – (0.0005 × 291,400)

⇒ P = ₹354.30

Calculate Profit

	₹
Revenue (2,91,400 batches × ₹354.3)	10,32,43,020
Less: Variable costs (2,91,400 batches × ₹208.60)	6,07,86,040
Less: Fixed costs (3,00,000 batches × ₹35)	1,05,00,000
Profit	3,19,56,980

(ii) Firms often use different pricing strategies when their products are first launched into the market. The most two common approaches are price skimming and penetration pricing.

In ***penetration pricing***, low price is charged initially, thought behind this is that low price will make the product accessible to large number of buyers, so high sales will compensate the low price being charged getting the benefits of economy of scale. This approach works best when customers are *price sensitive*, R & D and marketing expenses are low, or when competitors will quickly enter the market.

In this case, medicines are *highly inelastic* in nature so any reduction in price will not increase the demand of the drug, which clearly indicates that market penetration pricing will not help.

Skimming Pricing refers to charging high price initially than lower the prices. High price in the early stage of the product's life cycle is expected to generate high initial cash flows, which will help the company to recover high development cost. This would enable the company to take advantage of unique nature of the product.

In present case, the unique nature of drug, entry barrier (since company has taken patent) requires huge initial investment and considering this market skimming pricing strategy would be more favorable pricing strategy. However, this strategy only works as long as drug is protected by patent.

In addition, a drug firm is required to consider the expected reactions from national price controllers who in turn may be influenced by political factors and public opinion.

Practical Insight

Most of the people in developing countries buy medicines through out-of-pocket payments, high prices of medicines might force people to forego treatment or go into debt. As a result, price of the medicines may be regulated by the health organisations/ agencies.

7. (i) The loss in case of temporary discontinue is ₹185 lakhs which is less than the loss in case of continuing the production of CVS (i.e., ₹250 lakhs), hence **considering monetary aspects** it is advised to discontinue (lock-out) the production of CSV for the first half of the fiscal year 2020-21.

Comparative Cost and Benefit for the first half of the fiscal year 2020-21

Continue – 40,000 units		**Dis-continue (Lock-out)**	
Particulars	**Amount in ₹**	**Particulars**	**Amount in ₹**
Contribution (₹500×40,000units)	200 Lakhs	Additional Cost (resumption)	35 Lakhs
Fixed Cost	450 Lakhs	Fixed Cost (unavoidable)	150 Lakhs
Loss	**250 Lakhs**	**Cost**	**185 lakhs**

Working note 1 – Contribution *per unit*

Particulars	**Amount in ₹**
Sale Price	1,600
Variable Cost (575+215+310)	1,100
Contribution	500

Working note 2 – Fixed Cost & Avoidable Component

Particulars	Amount in ₹
Total Fixed Cost for the first half [(75,000×2) units ×300]	450 Lakhs
Unavoidable (1/3rd)	150 Lakhs
Balance - Avoidable (2/3rd)	300 Lakhs

(ii) Qualitative factors, while deciding either discontinue (lock-out) or continue.

(a) Government advisory regarding lock-down and lock-in – MGIL is legally bound to observe and comply with government advisories regarding lock-down and lock-in.

(b) Customer relations – Discontinuing the production, even temporary may cause adverse reactions from customers, they may move to another product or brand which capable to substitute CVS. Further as per the director's opinion old stock will be cleared during such period, this may cause a *loss of reputation*.

(c) Supplier relations – The trade relation with suppliers of VSD/MGIL may turn bitter if supply halted. May also cause a loss of goodwill. Although the director argued that supplier can sell the old stock available with them, but it is nowhere mentioned that whether all the supplier or retailer have a *requisite amount of stock* in order to cater the need of their customers.

(d) Employee/Worker relations – One of the directors mentioned that migrant workers moved to their home states and expected to come back in 3-5 months. It is important to identify– *how much of the workforce* at VSD is migrant and *what is the duration of lock-down* announced by the government, is there any relaxation in the same (for example working with 1/3 or 1/2 capacity)? VSD also need to consider *guideline and term of the agreement with workers*, in regard to the compensation they will get, if it is decided to lock-out (temporarily discontinue the production). Apart from this, staff (or workers) morale is also an important factor to consider.

(e) Timing of shutdown – Timing (when to lock and unlock) and duration of lock-out, both are important form preview of VSD, because the kind of product in which MGIL deals either in demand during the *relevant season* or *near festival season* (during sales and bonanzas).

(f) Whether discontinuing a segment have adverse effects on the sale of other products – CVS is a *complementary product* to other models sold by

VDS and product sold by MGIL. Hence, impact of discontinuing the production of CVS on sale of these relate products need to be considered.

(iii) In order to economically justify the decision of continuing the production, VSD need to manufacture and sell such number of CVS; so that loss (if continued) shall be less than or equal to the loss/ cost of ₹185 lakhs (which is due to discontinue (lock-out) of plant for the first half of fiscal 2020-21).

So, let presume 'x' is such number of CSV

450 Lakhs – (₹ 500 × 'x') ≤ 185 Lakhs

⇒ 500x ≥ 265 Lakhs

x ≥ 53,000 Units

Hence, VSD need to manufacture and sell at least 53,000 units of CVS; in order to economically justify the continuation of the production.

8. Comparative 'Statement of Cost' *for* Purchasing from Y under 'Current Policy' & 'JIT'

Particulars	**Current Policy (₹)**	**JIT (₹)**
Purchasing Cost	18,20,000 (13,000 units × ₹140)	18,20,260 (13,000 units × ₹140.02)
Ordering Cost	26.00 (₹2 × 13 Orders)	260.00 (₹2 ×130 Orders)
Opportunity / Carrying Cost	10,500.00 (1/2 × 1,000 units × ₹140 × 15%)	1,050 (1/2 × 100 units × ₹ 140.02 × 15%)
Other Carrying Cost (Insurance, Material Handling etc)	1,550.00 (1/2 × 1,000 units × ₹3.10)	155.00 (1/2 × 100 units × ₹3.10)
Stock Out Cost	---	200 (50 units × ₹4.00)
Total Relevant Cost	**18,32,076**	**18,21,925**

Comments

As may be seen from above, the relevant cost under the JIT purchasing policy is lower than the cost incurred under the existing system. Hence, a JIT purchasing policy should be adopted by the company.

9. *"For successful operation of JIT inventory system, the suppliers chosen must be willing to make frequent deliveries in small lots. Rather than deliver a week's or a month's material at one time, suppliers must be willing to make deliveries several times a day and in the exact quantities specified by the buyer."*

It is described in the problem that suppliers are not willing to

- make frequent deliveries and
- make supplies in the exact quantities as required.

Accordingly Mr. W's doubt is correct on successful implementation of JIT System.

10. Type-X indicates to a feedforward control system. A feedforward control system operates by comparing budgeted results against a forecast. So that, corrective action can be taken to avoid expected adverse variances.

Type-X

'Gross Collection' Report for July

Activity	Budget	Most Recent Forecast for the year	Expected Variance
Accounting	16,560	17,250	690 (F)
Auditing	10,350	8,280	2,070 (A)
Taxation	14,490	13,386	1,104 (A)
Total	**41,400**	38,916	2,484 (A)

Type-Y reveals feedback control system. A feedback control system identifies variances that has already taken place, by comparing the actual historical results with the budgeted results.

Type-Y

'Gross Collection' Report for July

Activity	Monthly			Cumulative		
	Budget	Actual	Variance	Budget	Actual	Variance
Accounting	2,415	2,622	207 (F)	6,210	6,486	276 (F)
Auditing	1,380	966	414 (A)	3,450	2,691	759 (A)
Taxation	1,725	1,587	138 (A)	3,450	3,105	345 (A)
Total	5520	5175	345 (A)	13110	12282	828 (A)

Note- Both Feedback and Feedforward Controls may coexist in the same system, but the two designs function in very different ways.

11. Statement Showing 'Customer Profitability Analysis'

Particulars	T_1	T_2	Channel Total	T_3	T_4	Channel Total
	Small Stores			Large Stores		
Revenue at List Price	1,60,000	1,80,000	3,40,000	25,50,000	12,00,000	37,50,000
Discount	8,000	18,000	26,000	4,59,000	1,44,000	6,03,000
Net Revenue	152,000	1,62,000	3,14,000	20,91,000	10,56,000	31,47,000
Variable Costs	1,28,000	1,44,000	2,72,000	20,40,000	9,60,000	30,00,000
Contribution Margin	24,000	18,000	42,000	51,000	96,000	1,47,000
Order Processing	3,000	6,750	9,750	4,500	2,250	6,750
Regular Deliveries	1,500	3,375	4,875	2,250	1,125	3,375
Expedited Deliveries	2,500	---	2,500	2,500	---	2,500
Customer Profit	17,000	7,875	24,875	41,750	92,625	1,34,375
Channel Cost			20,250			48,375
Channel Profit			4,625			86,000

Comment

T is only just at breakeven point with small pharmaceuticals. To improve profit T should:

(i) Coordinate with T_2 to *increase order size* and try to *negotiate a smaller discount*.

(ii) Try to work with T_1 to *reduce number of expedited deliveries*.

T makes substantial profit from the large pharmaceuticals. T may give *little extra attention* on T_4 as T_4 is most favorable customer and its order is for large quantities. For T_3, T may have *no options* as T_3 accounts more than 50% of Sales.

12. Identification of Perspectives of Independent Situation - 'Balance Scorecard'

Sl. No.	Organization	Perspective
(i)	Courier Company	Customer Perspective
(ii)	Tuition Centre	Learning and Growth Perspective
(iii)	Computer Manufacturing Company	Internal Business Perspective
(iv)	Government Taxation Department	Learning and Growth Perspective

13. Calculation of labour hours required

No. of units	Cumulative Average Time per unit (hrs.)	Total Hours
1	10	10
2	8	16
4	6.4	25.6
8	5.12	40.96

Calculation of price to be quoted for 8 motors

	₹
Material Cost (8 × ₹2,500)	20,000
Labour Cost (40.96 × ₹175)	7,168
Overheads (7168 × 125%)	8,960
Total Cost	**36,128**
Add: Profit 20% on sales i.e., 25% on cost	9,032
Price to be quoted	**45,160**